

## Claims

- [c1] A method of manufacturing a bipolar plate module comprising an anode plate, a cathode plate, and a membrane electrode assembly (MEA) disposed between the anode plate and the cathode plate, the method steps comprising the steps of:
- placing the anode plate, the cathode plate and the MEA within a mold;
  - injecting a sealing material into the mold, whereby the seal material fills grooves formed on the anode or cathode plates to form an insulation layer, the material flows through through-holes formed in the grooves of either the anode plate or the cathode plate to form a sealing layer between the plates and to form an edge seal about a portion of the MEA; and
  - curing the sealing material to bind the anode plate to the cathode plate, thereby forming a bipolar plate module.
- [c2] A method of manufacturing a bipolar plate module according to Claim 1, wherein the sealing material comprises a silicone material.
- [c3] A method of manufacturing a bipolar plate module according to Claim 1, wherein the sealing material is epoxy

nitrile.

- [c4] A method of manufacturing a bipolar plate module according to Claim 1, wherein the pressure for injecting the sealing material is between about 300–700 lb/in<sup>2</sup>.
- [c5] A method of manufacturing a bipolar plate module according to Claim 1, wherein said temperature of the sealing material when injected into the mold is between about 75–400 degrees Fahrenheit.
- [c6] A method of manufacturing a bipolar plate module according to Claim 1, wherein said curing step includes applying pressure to the anode and cathode plates.
- [c7] A method of manufacturing a bipolar plate module comprising an anode plate, a cathode plate, and a membrane electrode assembly (MEA) disposed between the anode plate and the cathode plate, the method comprising the steps of:
  - screen printing a sealing material upon one of a anode plate and a cathode plate;
  - positioning the MEA upon one of the anode plate and the cathode plate;
  - placing the other one of the anode plate and cathode plate upon the MEA;
  - curing the sealing material to form a sealing layer be–

tween the anode and cathode plates and to form an edge seal about a portion of the MEA, thereby binding the anode plate to the cathode plate to form a bipolar plate module.

- [c8] A method of manufacturing a bipolar plate module according to Claim 7, wherein the sealing material is deposited upon a perimeter of the anode or cathode plate.
- [c9] A method of manufacturing a bipolar plate module according to Claim 7, wherein the sealing material comprises a silicone material.
- [c10] A method of manufacturing a bipolar plate module according to Claim 7, wherein the sealing material is epoxy nitrile.
- [c11] A method of manufacturing a bipolar plate module according to Claim 7, wherein the step of positioning the MEA upon one of the anode plate and the cathode plate is performed before said screen-printing step.
- [c12] A method of manufacturing a bipolar plate module according to Claim 7, further including the step of forming an insulation layer between two bipolar plate modules.
- [c13] A method of manufacturing a bipolar plate module according to Claim 12, wherein the sealing material fills

grooves formed on the anode plate and cathode plate to form the insulation layer.

[c14] A method of manufacturing a bipolar plate module according to Claim 7, wherein said curing step includes applying pressure to the anode and cathode plates.